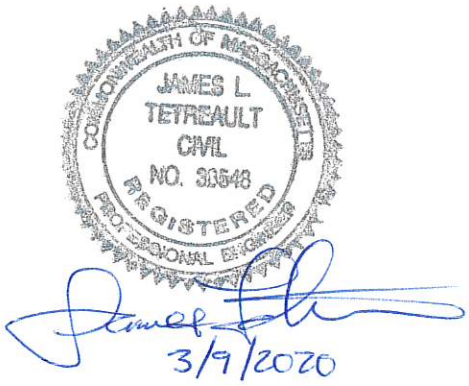
DRAINAGE REPORT

for

80 SNOW ROAD, GRAFTON, MA

Job #110-3301 Client #3151

MARCH 9, 2020



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Drainage Report

for

Lots 2 & 3 at 80 Snow Road in Grafton, Massachusetts

March 9, 2020

Project Description

The site is located on the easterly side of Snow Road at #80, south of Greany Drive and north of Tracy Ann Drive. It is shown as parcel 66 on Grafton Assessor's Map 28. Lot 2 has an area of 29,579 square feet while Lot 3 has an area of 38,816 square feet. The site was previously developed for a single family home.

The site receives some stormwater runoff from lots owned, now or formerly, by Pueschel and by Burton to the north on Greany Drive and from a lot owned, now or formerly, by Kelly off Tracy Ann Drive.

Some of this property drains into Snow Road and some of it drains into the Grafton & Upton railroad property. Those property lines are the two design points that are studied.

That former house on this property has been torn down but the comparison of this drainage report will be of proposed conditions to that predevelopment condition when the former house was in place.

Soils on site are mostly Scituate series soils categorized as hydrologic soil group "C" except for the east end of the property which lies over Canton series soils categorized as hydrologic soil group "B". Two deep holes were excavated on site to determine soil texture and the depth to seasonal high groundwater. At deep hole #1, we excavated 85 inches down from the surface and did not encounter mottling or weeping. Soils were dry and had a sand texture. At deep hole #2, we excavated 90 inches down from the surface and did not encounter mottling or weeping. Soils at that location were dry and had a loamy sand texture.

Two duplexes are proposed along with the driveways to access them and the normal lawn and landscaping around them. In order to mitigate the increase in stormwater runoff that would result from changing more of the site's cover to impervious and lawn from what is considered wooded in the predevelopment, we will capture roof runoff and some surface runoff and direct it to infiltration structures.

We propose one VortSentry catch basin on each lot which will capture lawn and driveway runoff and will remove total suspended solids so that captured runoff can be directed to the infiltration structure on each lot.

The infiltration structure on Lot 2 will be an irregular shaped polygon covering 1,424 square feet and filled with stone from elevation 326 to elevation 331.5. Within that stone envelope will be 51 Cultec model 902 chambers.

The infiltration structure on Lot 3 will be a rectangle measuring 104.76 feet by 15.5 feet, an area of 1,624 square feet and filled with stone from elevation 323 to elevation 328.5. Within that stone envelope will be 56 Cultec model 902 chambers.

Both structures just begin to have piped discharge in the 25 year return frequency storm even but none before that.

As a result of infiltrating runoff from both proposed roof areas and some of the other surface runoff, the peak rate of flow to Snow Road and to the Grafton & Upton railroad will decrease compared to predevelopment flows.

Methodology

In order to evaluate the existing and proposed hydrologic conditions of the site, we have employed the HydroCAD™ stormwater modeling software, which emulates the United States Department of Agriculture, Soil Conservation Service (SCS) hydrograph method as outlined in Technical Release 20 (1982). We have used the SCS modified soil cover complex method of evaluating cover conditions and underlying soil features in developing runoff curve numbers (RCN),

and have determined Times of Concentration (ToC), using the methods described in the SCS's National Engineering Handbook, Section 4, Hydrology (1985). Each watershed with its Area, RCN and ToC, is described as a "Subcatchment" in HydroCAD™.

HydroCAD™ uses the Storage-Indication method for routing flows from "Subcatchment" areas through "Reaches" and "Ponds." Reaches are overland flow paths, pipe segments, or stream segments. Ponds are areas that collect water, such as basins, ponds or swales where outlet devices control outflow.

Per Town of Grafton standards, the 24 hour rainfalls used for the 2, 10, 25 and 100 year return frequency storm events was 3.23, 4.87, 6.16 and 8.79 inches. The SCS's Type III Rainfall Distribution is used for these calculations, and is described in SCS Technical Release 55 (1986).

Design Points

As noted above, there are two design points. The more northerly portion of the property drains into Snow Road. The predevelopment flow into Snow Road is modeled as subcatchment #1 and the total of the postdevelopment runoff into Snow Road is modeled by reach 11R.

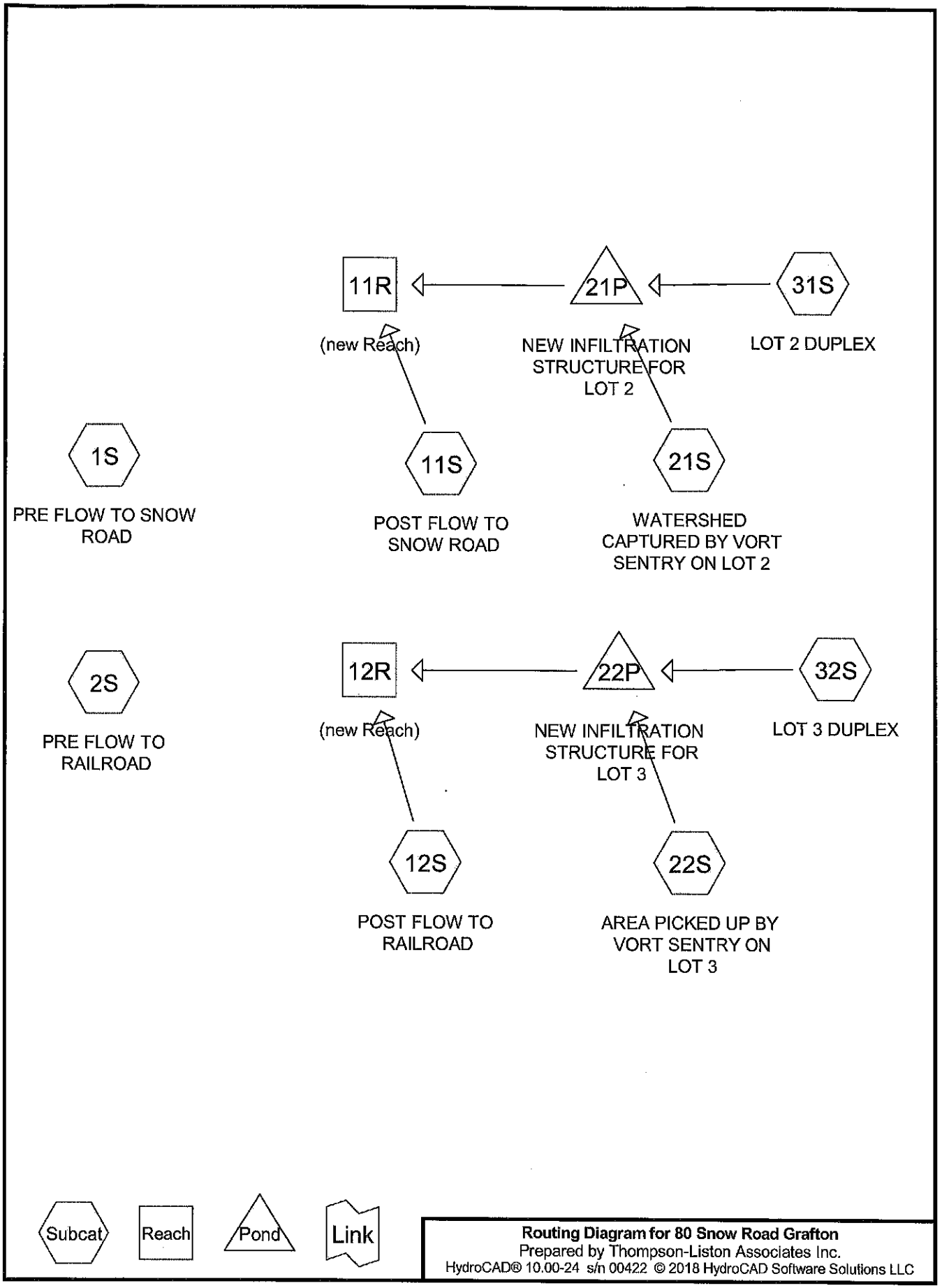
The more southerly portion of the property drains onto the land of the Grafton & Upton railroad. The predevelopment flow onto the Grafton & Upton railroad is modeled as subcatchment #2 and the total of the postdevelopment runoff onto that abutting property is modeled as reach 12R.

Calculation Summary and Comparison of Flows:

In all of the storms studied, the 2-, 10-, 25- and 100-year storms, the runoff leaving the site in the post-development condition will not exceed the peak runoff in the existing (pre-development) condition. The following Table A shows the comparison of pre- and post-development flows at the Design Point:

TABLE A
Runoff Summaries for Storm Events

Design Point	2-YR	10-YR	25-YR	100-YR
Snow Road				
Subcatchment 1 pre	1.12 cfs	2.42 cfs	3.52 cfs	5.83 cfs
Reach 11R post	1.10	2.35	3.42	5.74
Grafton & Upton railroad				
Subcatchment 2 pre	1.21 cfs	3.51 cfs	5.65 cfs	10.46 cfs
Reach 12R post	0.83	2.42	3.89	9.97



Routing Diagram for 80 Snow Road Grafton
Prepared by Thompson-Liston Associates Inc.

2 YEAR STORM

Summary for Subcatchment 1S: PRE FLOW TO SNOW ROAD

Runoff = 1.12 cfs @ 12.13 hrs, Volume= 0.084 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

Area (sf)	CN	Description
4,853	98	Paved parking, HSG C
5,631	70	Woods, Good, HSG C
30,396	74	>75% Grass cover, Good, HSG C
40,880	76	Weighted Average
36,027		88.13% Pervious Area
4,853		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	180	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	35	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	265	Total			

Summary for Subcatchment 2S: PRE FLOW TO RAILROAD

Runoff = 1.21 cfs @ 12.15 hrs, Volume= 0.105 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

Area (sf)	CN	Description
1,475	98	Paved parking, HSG A
26,210	61	>75% Grass cover, Good, HSG B
11,300	55	Woods, Good, HSG B
7,319	74	>75% Grass cover, Good, HSG C
47,676	70	Woods, Good, HSG C
93,980	66	Weighted Average
92,505		98.43% Pervious Area
1,475		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.5	129	0.1000	4.74		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.5	246	0.0560	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.9	425	Total			

Summary for Subcatchment 11S: POST FLOW TO SNOW ROAD

Runoff = 1.10 cfs @ 12.12 hrs, Volume= 0.080 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

	Area (sf)	CN	Description
*	1,303	98	Houses
*	1,948	98	Driveway
	35,606	74	>75% Grass cover, Good, HSG C
	38,857	76	Weighted Average
	35,606		91.63% Pervious Area
	3,251		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.1	223	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	273	Total			

Summary for Subcatchment 12S: POST FLOW TO RAILROAD

Runoff = 0.83 cfs @ 12.12 hrs, Volume= 0.067 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

	Area (sf)	CN	Description
*	397	98	House
*	3,097	39	Driveway
	7,161	55	Woods, Good, HSG B
	17,103	61	>75% Grass cover, Good, HSG B
	1,639	70	Woods, Good, HSG C
	30,576	74	>75% Grass cover, Good, HSG C
	59,973	66	Weighted Average
	59,576		99.34% Pervious Area
	397		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.8	142	0.0420	3.07		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	42	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	234	Total			

Summary for Subcatchment 21S: WATERSHED CAPTURED BY VORT SENTRY ON LOT 2

Runoff = 0.57 cfs @ 12.11 hrs, Volume= 0.041 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

	Area (sf)	CN	Description
*	1,080	98	Roofs
	943	98	Paved parking, HSG C
	2,238	55	Woods, Good, HSG B
	9,200	61	>75% Grass cover, Good, HSG B
	14,809	74	>75% Grass cover, Good, HSG C
	28,270	70	Weighted Average
	26,247		92.84% Pervious Area
	2,023		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.3	285	0.0610	3.70		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.2	335	Total			

Summary for Subcatchment 22S: AREA PICKED UP BY VORT SENTRY ON LOT 3

Runoff = 0.85 cfs @ 12.08 hrs, Volume= 0.057 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

Area (sf)	CN	Description
3,097	98	Paved parking, HSG B
1,428	55	Woods, Good, HSG B
1,978	61	>75% Grass cover, Good, HSG B
22,852	74	>75% Grass cover, Good, HSG C
29,355	75	Weighted Average
26,258		89.45% Pervious Area
3,097		10.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.1400	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	197	0.0560	3.55		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	54	0.0350	3.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	301	Total			

Summary for Subcatchment 31S: LOT 2 DUPLEX

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 0.017 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

Area (sf)	CN	Description
3,200	98	Roofs, HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 32S: LOT 3 DUPLEX

Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.024 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.23"

Area (sf)	CN	Description
4,560	98	Roofs, HSG C
4,560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach 11R: (new Reach)

Inflow Area = 1.614 ac, 12.05% Impervious, Inflow Depth > 0.59" for 2 YEAR event
Inflow = 1.10 cfs @ 12.12 hrs, Volume= 0.080 af
Outflow = 1.10 cfs @ 12.12 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 12R: (new Reach)

Inflow Area = 2.155 ac, 8.58% Impervious, Inflow Depth > 0.38" for 2 YEAR event
Inflow = 0.83 cfs @ 12.12 hrs, Volume= 0.067 af
Outflow = 0.83 cfs @ 12.12 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 21P: NEW INFILTRATION STRUCTURE FOR LOT 2

Inflow Area = 0.722 ac, 16.60% Impervious, Inflow Depth > 0.97" for 2 YEAR event
Inflow = 0.78 cfs @ 12.10 hrs, Volume= 0.058 af
Outflow = 0.08 cfs @ 11.80 hrs, Volume= 0.058 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.80 hrs, Volume= 0.058 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.33' @ 13.49 hrs Surf.Area= 1,424 sf Storage= 971 cf

Plug-Flow detention time= 119.8 min calculated for 0.058 af (100% of inflow)
Center-of-Mass det. time= 118.2 min (919.8 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	1,806 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,832 cf Overall - 3,318 cf Embedded = 4,514 cf x 40.0% Voids
#2	327.00'	3,318 cf	**Cultec R-902HD** x 51 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 51 Chambers in 3 Rows Cap Storage= +2.8 cf x 2 x 3 rows = 16.6 cf
		5,124 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	1,424	0	0
331.50	1,424	7,832	7,832

Device	Routing	Invert	Outlet Devices
#1	Discarded	326.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	330.60'	**6.0" Round Culvert X 3.00** L= 170.0' Ke= 0.500 Inlet / Outlet Invert= 330.60' / 328.90' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.08 cfs @ 11.80 hrs HW=326.07' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=326.00' (Free Discharge)
2=Culvert (Controls 0.00 cfs)

Summary for Pond 22P: NEW INFILTRATION STRUCTURE FOR LOT 3

Inflow Area = 0.779 ac, 22.58% Impervious, Inflow Depth > 1.26" for 2 YEAR event
Inflow = 1.18 cfs @ 12.08 hrs, Volume= 0.082 af
Outflow = 0.09 cfs @ 11.65 hrs, Volume= 0.070 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.09 cfs @ 11.65 hrs, Volume= 0.070 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 324.66' @ 13.83 hrs Surf.Area= 1,624 sf Storage= 1,545 cf

Plug-Flow detention time= 165.1 min calculated for 0.070 af (85% of inflow)
Center-of-Mass det. time= 121.4 min (913.1 - 791.6)

Volume	Invert	Avail.Storage	Storage Description
#1	323.00'	2,118 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,932 cf Overall - 3,636 cf Embedded = 5,296 cf x 40.0% Voids
#2	324.00'	3,636 cf	**Cultec R-902HD** x 56 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 56 Chambers in 2 Rows Cap Storage= +2.8 cf x 2 x 2 rows = 11.0 cf
		5,755 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
323.00	1,624	0	0
328.50	1,624	8,932	8,932

Device	Routing	Invert	Outlet Devices
#1	Discarded	323.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	327.50'	**8.0" Round Culvert X 3.00** L= 8.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 327.00' S= 0.0625 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Discarded OutFlow Max=0.09 cfs @ 11.65 hrs HW=323.06' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=323.00' (Free Discharge)
2=Culvert (Controls 0.00 cfs)

10 YEAR STORM

Summary for Subcatchment 1S: PRE FLOW TO SNOW ROAD

Runoff = 2.42 cfs @ 12.12 hrs, Volume= 0.176 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

Area (sf)	CN	Description
4,853	98	Paved parking, HSG C
5,631	70	Woods, Good, HSG C
30,396	74	>75% Grass cover, Good, HSG C
40,880	76	Weighted Average
36,027		88.13% Pervious Area
4,853		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	180	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	35	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	265	Total			

Summary for Subcatchment 2S: PRE FLOW TO RAILROAD

Runoff = 3.51 cfs @ 12.14 hrs, Volume= 0.269 af, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

Area (sf)	CN	Description
1,475	98	Paved parking, HSG A
26,210	61	>75% Grass cover, Good, HSG B
11,300	55	Woods, Good, HSG B
7,319	74	>75% Grass cover, Good, HSG C
47,676	70	Woods, Good, HSG C
93,980	66	Weighted Average
92,505		98.43% Pervious Area
1,475		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.5	129	0.1000	4.74		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.5	246	0.0560	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.9	425	Total			

Summary for Subcatchment 11S: POST FLOW TO SNOW ROAD

Runoff = 2.35 cfs @ 12.11 hrs, Volume= 0.168 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

	Area (sf)	CN	Description
*	1,303	98	Houses
*	1,948	98	Driveway
	35,606	74	>75% Grass cover, Good, HSG C
	38,857	76	Weighted Average
	35,606		91.63% Pervious Area
	3,251		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.1	223	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	273	Total			

Summary for Subcatchment 12S: POST FLOW TO RAILROAD

Runoff = 2.42 cfs @ 12.11 hrs, Volume= 0.172 af, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

	Area (sf)	CN	Description
*	397	98	House
*	3,097	39	Driveway
	7,161	55	Woods, Good, HSG B
	17,103	61	>75% Grass cover, Good, HSG B
	1,639	70	Woods, Good, HSG C
	30,576	74	>75% Grass cover, Good, HSG C
	59,973	66	Weighted Average
	59,576		99.34% Pervious Area
	397		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.8	142	0.0420	3.07		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	42	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	234	Total			

Summary for Subcatchment 21S: WATERSHED CAPTURED BY VORT SENTRY ON LOT 2

Runoff = 1.41 cfs @ 12.10 hrs, Volume= 0.097 af, Depth> 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

	Area (sf)	CN	Description
*	1,080	98	Roofs
	943	98	Paved parking, HSG C
	2,238	55	Woods, Good, HSG B
	9,200	61	>75% Grass cover, Good, HSG B
	14,809	74	>75% Grass cover, Good, HSG C
	28,270	70	Weighted Average
	26,247		92.84% Pervious Area
	2,023		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.3	285	0.0610	3.70		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.2	335	Total			

Summary for Subcatchment 22S: AREA PICKED UP BY VORT SENTRY ON LOT 3

Runoff = 1.85 cfs @ 12.08 hrs, Volume= 0.122 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

Area (sf)	CN	Description
3,097	98	Paved parking, HSG B
1,428	55	Woods, Good, HSG B
1,978	61	>75% Grass cover, Good, HSG B
22,852	74	>75% Grass cover, Good, HSG C
29,355	75	Weighted Average
26,258		89.45% Pervious Area
3,097		10.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.1400	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	197	0.0560	3.55		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	54	0.0350	3.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	301	Total			

Summary for Subcatchment 31S: LOT 2 DUPLEX

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.026 af, Depth> 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

Area (sf)	CN	Description
3,200	98	Roofs, HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 32S: LOT 3 DUPLEX

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 0.038 af, Depth> 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.87"

Area (sf)	CN	Description
4,560	98	Roofs, HSG C
4,560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach 11R: (new Reach)

Inflow Area = 1.614 ac, 12.05% Impervious, Inflow Depth > 1.25" for 10 YEAR event
Inflow = 2.35 cfs @ 12.11 hrs, Volume= 0.168 af
Outflow = 2.35 cfs @ 12.11 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 12R: (new Reach)

Inflow Area = 2.155 ac, 8.58% Impervious, Inflow Depth > 0.96" for 10 YEAR event
Inflow = 2.42 cfs @ 12.11 hrs, Volume= 0.172 af
Outflow = 2.42 cfs @ 12.11 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 21P: NEW INFILTRATION STRUCTURE FOR LOT 2

Inflow Area = 0.722 ac, 16.60% Impervious, Inflow Depth > 2.04" for 10 YEAR event
Inflow = 1.75 cfs @ 12.09 hrs, Volume= 0.123 af
Outflow = 0.08 cfs @ 11.40 hrs, Volume= 0.065 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.40 hrs, Volume= 0.065 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 329.06' @ 15.65 hrs Surf.Area= 1,424 sf Storage= 3,005 cf

Plug-Flow detention time= 191.3 min calculated for 0.065 af (53% of inflow)
Center-of-Mass det. time= 104.7 min (897.5 - 792.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	1,806 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,832 cf Overall - 3,318 cf Embedded = 4,514 cf x 40.0% Voids
#2	327.00'	3,318 cf	**Cultec R-902HD** x 51 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 51 Chambers in 3 Rows Cap Storage= +2.8 cf x 2 x 3 rows = 16.6 cf
		5,124 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	1,424	0	0
331.50	1,424	7,832	7,832

Device	Routing	Invert	Outlet Devices
#1	Discarded	326.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	330.60'	**6.0" Round Culvert X 3.00** L= 170.0' Ke= 0.500 Inlet / Outlet Invert= 330.60' / 328.90' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.08 cfs @ 11.40 hrs HW=326.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=326.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 22P: NEW INFILTRATION STRUCTURE FOR LOT 3

Inflow Area =	0.779 ac, 22.58% Impervious, Inflow Depth > 2.46" for 10 YEAR event			
Inflow =	2.35 cfs @ 12.08 hrs, Volume=	0.160 af		
Outflow =	0.09 cfs @ 11.05 hrs, Volume=	0.078 af, Atten= 96%, Lag= 0.0 min		
Discarded =	0.09 cfs @ 11.05 hrs, Volume=	0.078 af		
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af		

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.62' @ 15.76 hrs Surf.Area= 1,624 sf Storage= 4,054 cf

Plug-Flow detention time= 185.3 min calculated for 0.078 af (49% of inflow)
Center-of-Mass det. time= 98.0 min (880.8 - 782.8)

Volume	Invert	Avail.Storage	Storage Description
#1	323.00'	2,118 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,932 cf Overall - 3,636 cf Embedded = 5,296 cf x 40.0% Voids
#2	324.00'	3,636 cf	**Cultec R-902HD** x 56 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 56 Chambers in 2 Rows Cap Storage= +2.8 cf x 2 x 2 rows = 11.0 cf
		5,755 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
323.00	1,624	0	0
328.50	1,624	8,932	8,932

Device	Routing	Invert	Outlet Devices
#1	Discarded	323.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	327.50'	**8.0" Round Culvert X 3.00** L= 8.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 327.00' S= 0.0625 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Discarded OutFlow Max=0.09 cfs @ 11.05 hrs HW=323.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=323.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

25 YEAR STORM

Summary for Subcatchment 1S: PRE FLOW TO SNOW ROAD

Runoff = 3.52 cfs @ 12.12 hrs, Volume= 0.257 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

Area (sf)	CN	Description
4,853	98	Paved parking, HSG C
5,631	70	Woods, Good, HSG C
30,396	74	>75% Grass cover, Good, HSG C
40,880	76	Weighted Average
36,027		88.13% Pervious Area
4,853		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	180	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	35	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	265	Total			

Summary for Subcatchment 2S: PRE FLOW TO RAILROAD

Runoff = 5.65 cfs @ 12.13 hrs, Volume= 0.424 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

Area (sf)	CN	Description
1,475	98	Paved parking, HSG A
26,210	61	>75% Grass cover, Good, HSG B
11,300	55	Woods, Good, HSG B
7,319	74	>75% Grass cover, Good, HSG C
47,676	70	Woods, Good, HSG C
93,980	66	Weighted Average
92,505		98.43% Pervious Area
1,475		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.5	129	0.1000	4.74		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.5	246	0.0560	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.9	425	Total			

Summary for Subcatchment 11S: POST FLOW TO SNOW ROAD

Runoff = 3.42 cfs @ 12.11 hrs, Volume= 0.244 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

	Area (sf)	CN	Description
*	1,303	98	Houses
*	1,948	98	Driveway
	35,606	74	>75% Grass cover, Good, HSG C
	38,857	76	Weighted Average
	35,606		91.63% Pervious Area
	3,251		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.1	223	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	273	Total			

Summary for Subcatchment 12S: POST FLOW TO RAILROAD

Runoff = 3.89 cfs @ 12.11 hrs, Volume= 0.271 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

	Area (sf)	CN	Description
*	397	98	House
*	3,097	39	Driveway
	7,161	55	Woods, Good, HSG B
	17,103	61	>75% Grass cover, Good, HSG B
	1,639	70	Woods, Good, HSG C
	30,576	74	>75% Grass cover, Good, HSG C
	59,973	66	Weighted Average
	59,576		99.34% Pervious Area
	397		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.8	142	0.0420	3.07		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	42	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	234	Total			

Summary for Subcatchment 21S: WATERSHED CAPTURED BY VORT SENTRY ON LOT 2

Runoff = 2.17 cfs @ 12.10 hrs, Volume= 0.147 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

	Area (sf)	CN	Description
*	1,080	98	Roofs
	943	98	Paved parking, HSG C
	2,238	55	Woods, Good, HSG B
	9,200	61	>75% Grass cover, Good, HSG B
	14,809	74	>75% Grass cover, Good, HSG C
	28,270	70	Weighted Average
	26,247		92.84% Pervious Area
	2,023		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.3	285	0.0610	3.70		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.2	335	Total			

Summary for Subcatchment 22S: AREA PICKED UP BY VORT SENTRY ON LOT 3

Runoff = 2.71 cfs @ 12.08 hrs, Volume= 0.179 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

Area (sf)	CN	Description
3,097	98	Paved parking, HSG B
1,428	55	Woods, Good, HSG B
1,978	61	>75% Grass cover, Good, HSG B
22,852	74	>75% Grass cover, Good, HSG C
29,355	75	Weighted Average
26,258		89.45% Pervious Area
3,097		10.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.1400	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	197	0.0560	3.55		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	54	0.0350	3.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	301	Total			

Summary for Subcatchment 31S: LOT 2 DUPLEX

Runoff = 0.45 cfs @ 12.07 hrs, Volume= 0.034 af, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

Area (sf)	CN	Description
3,200	98	Roofs, HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 32S: LOT 3 DUPLEX

Runoff = 0.64 cfs @ 12.07 hrs, Volume= 0.048 af, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=6.16"

Area (sf)	CN	Description
4,560	98	Roofs, HSG C
4,560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach 11R: (new Reach)

Inflow Area = 1.614 ac, 12.05% Impervious, Inflow Depth > 1.90" for 25 YEAR event
Inflow = 3.42 cfs @ 12.11 hrs, Volume= 0.255 af
Outflow = 3.42 cfs @ 12.11 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 12R: (new Reach)

Inflow Area = 2.155 ac, 8.58% Impervious, Inflow Depth > 1.69" for 25 YEAR event
Inflow = 3.89 cfs @ 12.11 hrs, Volume= 0.304 af
Outflow = 3.89 cfs @ 12.11 hrs, Volume= 0.304 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 21P: NEW INFILTRATION STRUCTURE FOR LOT 2

Inflow Area = 0.722 ac, 16.60% Impervious, Inflow Depth > 3.00" for 25 YEAR event
Inflow = 2.60 cfs @ 12.09 hrs, Volume= 0.180 af
Outflow = 0.16 cfs @ 14.25 hrs, Volume= 0.081 af, Atten= 94%, Lag= 129.6 min
Discarded = 0.08 cfs @ 10.80 hrs, Volume= 0.070 af
Primary = 0.08 cfs @ 14.25 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 330.69' @ 14.25 hrs Surf.Area= 1,424 sf Storage= 4,639 cf

Plug-Flow detention time= 182.9 min calculated for 0.081 af (45% of inflow)
Center-of-Mass det. time= 92.6 min (879.7 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	1,806 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,832 cf Overall - 3,318 cf Embedded = 4,514 cf x 40.0% Voids
#2	327.00'	3,318 cf	**Cultec R-902HD** x 51 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 51 Chambers in 3 Rows Cap Storage= +2.8 cf x 2 x 3 rows = 16.6 cf
		5,124 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	1,424	0	0
331.50	1,424	7,832	7,832

Device	Routing	Invert	Outlet Devices
#1	Discarded	326.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	330.60'	**6.0" Round Culvert X 3.00** L= 170.0' Ke= 0.500 Inlet / Outlet Invert= 330.60' / 328.90' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.08 cfs @ 10.80 hrs HW=326.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.08 cfs @ 14.25 hrs HW=330.69' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 0.08 cfs @ 1.53 fps)

Summary for Pond 22P: NEW INFILTRATION STRUCTURE FOR LOT 3

Inflow Area =	0.779 ac, 22.58% Impervious, Inflow Depth >	3.50"	for 25 YEAR event	
Inflow =	3.36 cfs @	12.07 hrs, Volume=	0.227 af	
Outflow =	0.35 cfs @	12.92 hrs, Volume=	0.117 af, Atten= 90%, Lag= 50.8 min	
Discarded =	0.09 cfs @	10.35 hrs, Volume=	0.084 af	
Primary =	0.25 cfs @	12.92 hrs, Volume=	0.033 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.66' @ 12.92 hrs Surf.Area= 1,624 sf Storage= 5,170 cf

Plug-Flow detention time= 159.8 min calculated for 0.117 af (51% of inflow)
Center-of-Mass det. time= 76.2 min (853.5 - 777.2)

Volume	Invert	Avail.Storage	Storage Description
#1	323.00'	2,118 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,932 cf Overall - 3,636 cf Embedded = 5,296 cf x 40.0% Voids
#2	324.00'	3,636 cf	**Cultec R-902HD** x 56 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 56 Chambers in 2 Rows Cap Storage= +2.8 cf x 2 x 2 rows = 11.0 cf
		5,755 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
323.00	1,624	0	0
328.50	1,624	8,932	8,932

Device	Routing	Invert	Outlet Devices
#1	Discarded	323.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	327.50'	**8.0" Round Culvert X 3.00** L= 8.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 327.00' S= 0.0625 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Discarded OutFlow Max=0.09 cfs @ 10.35 hrs HW=323.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.25 cfs @ 12.92 hrs HW=327.66' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.25 cfs @ 1.34 fps)

100 YEAR STORM

Summary for Subcatchment 1S: PRE FLOW TO SNOW ROAD

Runoff = 5.83 cfs @ 12.12 hrs, Volume= 0.432 af, Depth> 5.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

Area (sf)	CN	Description
4,853	98	Paved parking, HSG C
5,631	70	Woods, Good, HSG C
30,396	74	>75% Grass cover, Good, HSG C
40,880	76	Weighted Average
36,027		88.13% Pervious Area
4,853		11.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	180	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	35	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	265	Total			

Summary for Subcatchment 2S: PRE FLOW TO RAILROAD

Runoff = 10.46 cfs @ 12.13 hrs, Volume= 0.780 af, Depth> 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

Area (sf)	CN	Description
1,475	98	Paved parking, HSG A
26,210	61	>75% Grass cover, Good, HSG B
11,300	55	Woods, Good, HSG B
7,319	74	>75% Grass cover, Good, HSG C
47,676	70	Woods, Good, HSG C
93,980	66	Weighted Average
92,505		98.43% Pervious Area
1,475		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.5	129	0.1000	4.74		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.5	246	0.0560	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.9	425	Total			

Summary for Subcatchment 11S: POST FLOW TO SNOW ROAD

Runoff = 5.66 cfs @ 12.11 hrs, Volume= 0.411 af, Depth> 5.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

	Area (sf)	CN	Description
*	1,303	98	Houses
*	1,948	98	Driveway
	35,606	74	>75% Grass cover, Good, HSG C
	38,857	76	Weighted Average
	35,606		91.63% Pervious Area
	3,251		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.1	223	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	273	Total			

Summary for Subcatchment 12S: POST FLOW TO RAILROAD

Runoff = 7.20 cfs @ 12.10 hrs, Volume= 0.498 af, Depth> 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

	Area (sf)	CN	Description
*	397	98	House
*	3,097	39	Driveway
	7,161	55	Woods, Good, HSG B
	17,103	61	>75% Grass cover, Good, HSG B
	1,639	70	Woods, Good, HSG C
	30,576	74	>75% Grass cover, Good, HSG C
	59,973	66	Weighted Average
	59,576		99.34% Pervious Area
	397		0.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.8	142	0.0420	3.07		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	42	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	234	Total			

Summary for Subcatchment 21S: WATERSHED CAPTURED BY VORT SENTRY ON LOT 2

Runoff = 3.82 cfs @ 12.09 hrs, Volume= 0.260 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

	Area (sf)	CN	Description
*	1,080	98	Roofs
	943	98	Paved parking, HSG C
	2,238	55	Woods, Good, HSG B
	9,200	61	>75% Grass cover, Good, HSG B
	14,809	74	>75% Grass cover, Good, HSG C
	28,270	70	Weighted Average
	26,247		92.84% Pervious Area
	2,023		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0750	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.3	285	0.0610	3.70		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.2	335	Total			

Summary for Subcatchment 22S: AREA PICKED UP BY VORT SENTRY ON LOT 3

Runoff = 4.56 cfs @ 12.07 hrs, Volume= 0.304 af, Depth> 5.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

Area (sf)	CN	Description
3,097	98	Paved parking, HSG B
1,428	55	Woods, Good, HSG B
1,978	61	>75% Grass cover, Good, HSG B
22,852	74	>75% Grass cover, Good, HSG C
29,355	75	Weighted Average
26,258		89.45% Pervious Area
3,097		10.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.1400	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.9	197	0.0560	3.55		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	54	0.0350	3.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.9	301	Total			

Summary for Subcatchment 31S: LOT 2 DUPLEX

Runoff = 0.64 cfs @ 12.07 hrs, Volume= 0.048 af, Depth> 7.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

Area (sf)	CN	Description
3,200	98	Roofs, HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 32S: LOT 3 DUPLEX

Runoff = 0.91 cfs @ 12.07 hrs, Volume= 0.069 af, Depth> 7.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=8.79"

Area (sf)	CN	Description
4,560	98	Roofs, HSG C
4,560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach 11R: (new Reach)

Inflow Area = 1.614 ac, 12.05% Impervious, Inflow Depth > 3.99" for 100 YEAR event
Inflow = 5.74 cfs @ 12.20 hrs, Volume= 0.537 af
Outflow = 5.74 cfs @ 12.20 hrs, Volume= 0.537 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 12R: (new Reach)

Inflow Area = 2.155 ac, 8.58% Impervious, Inflow Depth > 3.68" for 100 YEAR event
Inflow = 9.97 cfs @ 12.15 hrs, Volume= 0.662 af
Outflow = 9.97 cfs @ 12.15 hrs, Volume= 0.662 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond 21P: NEW INFILTRATION STRUCTURE FOR LOT 2

Inflow Area = 0.722 ac, 16.60% Impervious, Inflow Depth > 5.12" for 100 YEAR event
Inflow = 4.43 cfs @ 12.09 hrs, Volume= 0.308 af
Outflow = 1.95 cfs @ 12.30 hrs, Volume= 0.204 af, Atten= 56%, Lag= 12.7 min
Discarded = 0.08 cfs @ 9.60 hrs, Volume= 0.078 af
Primary = 1.87 cfs @ 12.30 hrs, Volume= 0.126 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 331.43' @ 12.30 hrs Surf.Area= 1,424 sf Storage= 5,085 cf

Plug-Flow detention time= 112.7 min calculated for 0.204 af (66% of inflow)
Center-of-Mass det. time= 40.9 min (818.7 - 777.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.00'	1,806 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,832 cf Overall - 3,318 cf Embedded = 4,514 cf x 40.0% Voids
#2	327.00'	3,318 cf	**Cultec R-902HD** x 51 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 51 Chambers in 3 Rows Cap Storage= +2.8 cf x 2 x 3 rows = 16.6 cf
		5,124 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
326.00	1,424	0	0
331.50	1,424	7,832	7,832

Device	Routing	Invert	Outlet Devices
#1	Discarded	326.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	330.60'	**6.0" Round Culvert X 3.00** L= 170.0' Ke= 0.500 Inlet / Outlet Invert= 330.60' / 328.90' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.08 cfs @ 9.60 hrs HW=326.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=1.87 cfs @ 12.30 hrs HW=331.43' (Free Discharge)
└**2=Culvert** (Barrel Controls 1.87 cfs @ 3.18 fps)

Summary for Pond 22P: NEW INFILTRATION STRUCTURE FOR LOT 3

Inflow Area =	0.779 ac, 22.58% Impervious, Inflow Depth >	5.74"	for 100 YEAR event	
Inflow =	5.47 cfs @	12.07 hrs, Volume=	0.372 af	
Outflow =	4.03 cfs @	12.17 hrs, Volume=	0.257 af, Atten= 26%, Lag= 5.9 min	
Discarded =	0.09 cfs @	9.05 hrs, Volume=	0.093 af	
Primary =	3.94 cfs @	12.17 hrs, Volume=	0.164 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 328.41' @ 12.17 hrs Surf.Area= 1,624 sf Storage= 5,696 cf

Plug-Flow detention time= 103.3 min calculated for 0.256 af (69% of inflow)
Center-of-Mass det. time= 36.0 min (804.4 - 768.4)

Volume	Invert	Avail.Storage	Storage Description
#1	323.00'	2,118 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,932 cf Overall - 3,636 cf Embedded = 5,296 cf x 40.0% Voids
#2	324.00'	3,636 cf	**Cultec R-902HD** x 56 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 56 Chambers in 2 Rows Cap Storage= +2.8 cf x 2 x 2 rows = 11.0 cf
		5,755 cf	Total Available Storage

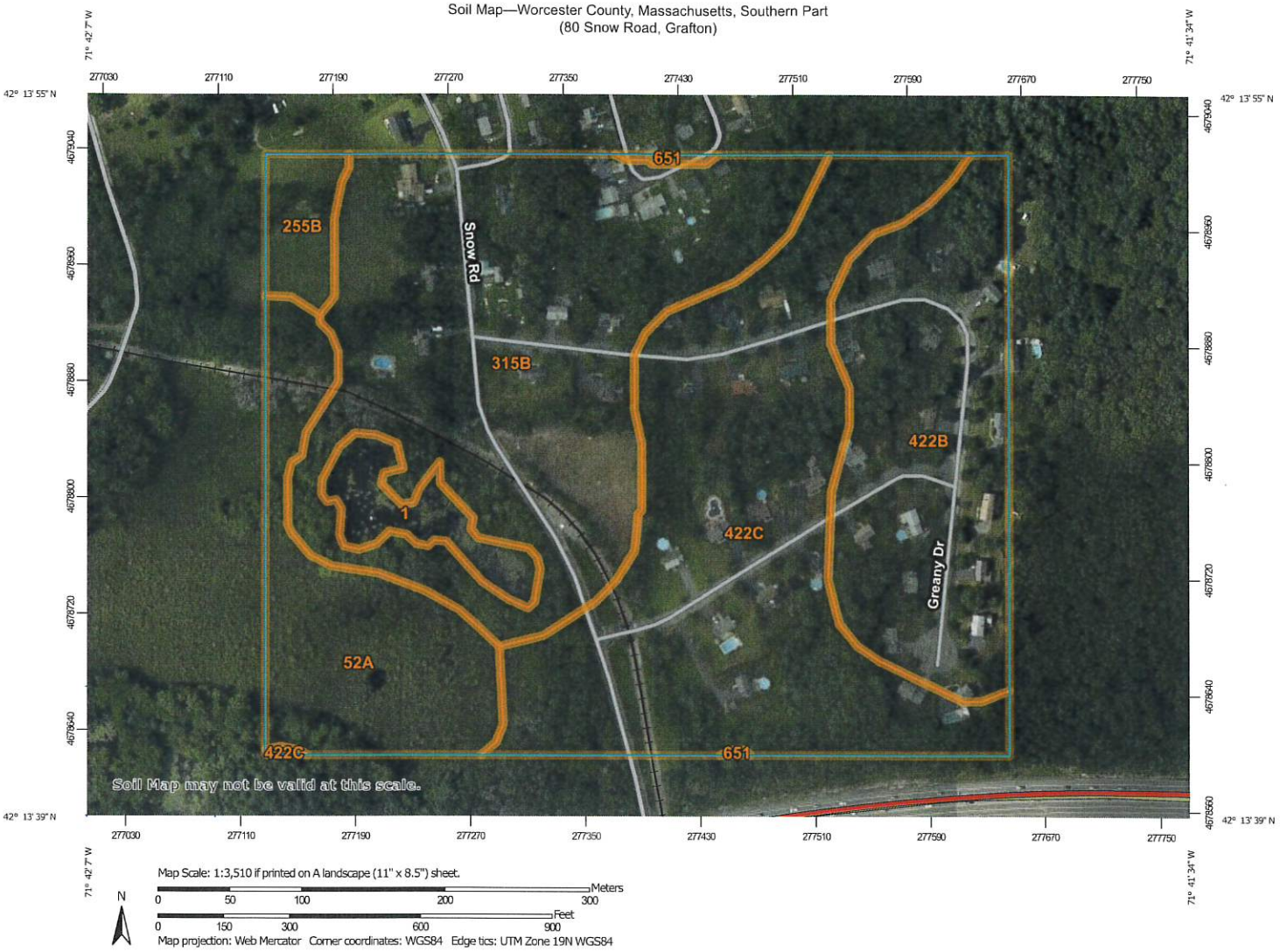
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
323.00	1,624	0	0
328.50	1,624	8,932	8,932

Device	Routing	Invert	Outlet Devices
#1	Discarded	323.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	327.50'	**8.0" Round Culvert X 3.00** L= 8.0' Ke= 0.500 Inlet / Outlet Invert= 327.50' / 327.00' S= 0.0625 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Discarded OutFlow Max=0.09 cfs @ 9.05 hrs HW=323.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=3.54 cfs @ 12.17 hrs HW=328.33' (Free Discharge)
└**2=Culvert** (Inlet Controls 3.54 cfs @ 3.38 fps)

Soil Map—Worcester County, Massachusetts, Southern Part
(80 Snow Road, Grafton)



Map Scale: 1:3,510 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 12, Sep 12, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	1.6	3.1%
52A	Freetown muck, 0 to 1 percent slopes	6.2	11.6%
255B	Windsor loamy sand, 3 to 8 percent slopes	1.3	2.4%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	17.7	33.3%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	9.8	18.4%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	16.6	31.1%
651	Udorthents, smoothed	0.1	0.2%
Totals for Area of Interest		53.2	100.0%

Commonwealth of Massachusetts
City/Town of Grafton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

CIL Realty of Massachusetts, Inc.
Owner Name

80 Snow Road
Street Address

Map 28 Parcel 66
Map/Lot #

North Grafton
City

MA
State

01536
Zip Code

B. Site Information

1. (Check one) ☐ New Construction ☒ Upgrade ☐ Repair

DH 1&2
2-25-2020

2. Soil Survey Available? ☒ Yes ☐ No If yes: MassGIS (Source) Soil Map Unit

Scituate
Soil Name

severe
Soil Limitations

till
Soil Parent material

uncertain
Landform

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: Year Published/Source Map Unit

Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer: Wetland Type

7. Current Water Resource Conditions (USGS): 2/24/20 (Month/Day/ Year) Range: ☐ Above Normal ☐ Normal ☒ Below Normal

8. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Grafton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 1 (Hole #) | 2-25-2022 (Date) | 8:40 A.M (Time) | 40° CLOUDY (Weather) | _____ (Latitude) | _____ (Longitude:)

1. Land Use: CLEARED WOODED LOT (e.g., woodland, agricultural field, vacant lot, etc.) | BRUSH (Vegetation) | SOME COBBLES (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 8% (Slope (%))

   Description of Location: ON FRONT OF LOT

2. Soil Parent Material: TILL | UNCERTAIN (Landform) | _____ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body ≈160 feet | Drainage Way _____ feet | Wetlands ≈150 feet
   Property Line 20' feet | Drinking Water Well _____ feet | Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☑ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-10"	A	SANDY LOAM	10YR 3/2								
10"-24"	B	SANDY LOAM	10YR 5/6								
24"-85"	C	SAND	10YR 6/4				50				

Additional Notes:
- NO REFUSAL
- NO WEEPING
- GROUND AT BOTTOM NOT MOIST

Commonwealth of Massachusetts
City/Town of Grafton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 2 (Hole #) 2-25-2020 (Date) 9:05 (Time) 40° CLOUDY (Weather) _____ (Latitude) _____ (Longitude:)

1. Land Use: CLEARED WOOD LOT (e.g., woodland, agricultural field, vacant lot, etc.) BRUSH (Vegetation) COBBLES (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 8% (Slope (%))

Description of Location: ON FRONT OF LOT

2. Soil Parent Material: TILL UNCERTAIN (Landform) _____ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body ≈ 140 feet; Drainage Way — feet; Wetlands ≈ 130 feet; Property Line ≈ 5 feet; Drinking Water Well — feet; Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☑ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-3"	A	10YR3/1	SANDY LOAM								
3"-18"	B	10YR4/6	SANDY LOAM								
18-90"	C	10YR5/3	LOAMY SAND				50				

Additional Notes: NO WEEPING
NO REFUSAL

Commonwealth of Massachusetts
City/Town of Grafton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	Obs. Hole # 1	Obs. Hole # 2
☑ Depth observed standing water in observation hole	NOT OBSERVED inches	NOT OBSERVED inches
☑ Depth weeping from side of observation hole	NOT OBSERVED inches	NOT OBSERVED inches
☑ Depth to soil redoximorphic features (mottles)	NOT OBSERVED inches	NOT OBSERVED inches
☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)	_____ inches	_____ inches

_____ Index Well Number _____ Reading Date

$S_h = S_c - [S_r \times (OW_c - OW_{max})/OW_r]$

Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

2. Estimated Depth to High Groundwater: _____ inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☑ Yes ☐ No

b. If yes, at what depth was it observed (exclude A and O Horizons)?	Upper boundary:	10", 3" inches	Lower boundary:	65", 90" inches
c. If no, at what depth was impervious material observed?	Upper boundary:	_____ inches	Lower boundary:	_____ inches

Commonwealth of Massachusetts
City/Town of Grafton

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator — Date: 2-25-2020

James Letreault, PE — SE2421
Typed or Printed Name of Soil Evaluator / License # — Expiration Date of License: July 2022

Name of Approving Authority Witness — Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams: